E/CONF.39/D/93
SUMMARY
17 Oct.1962
ORIGINAL : ENGLISH

UNITED NATIONS CONFERENCE
ON THE APPLICATION OF SCIENCE AND TECHNOLOGY
FOR THE BENEFIT OF THE LESS DEVELOPED AREAS

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Agenda Item: D.13

United Kingdom

THE PRODUCTION OF GLASS : POSSIBILITY OF SMALL SCALE PRODUCTION

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THE PRODUCTION OF GLASS - POSSIBILITY OF SMALL SCALE PRODUCTION

by

L.H.A. PILKINGTON, J.P., LL.D., M.A.

1. There are six main types of glass used in building:-

(a) Sheet or window glass
(b) Plate glass
(c) Float glass
(d) Patterned glass
(e) Hollow glass blocks
(f) Opaque cladding glasses.

2. The chemical composition for the main glasses is given.

3. The design of tank furnace used for the manufacture of all types of glass varies with the quality required in the final product and with the output to be produced.

4. A diagram of all the processes mentioned is given, starting at the storage of the raw materials and ending with the finished product.

5. Great care in the selection of raw materials is essential and absence of colouring oxides such as iron and chromium is needed. Specifications of raw materials are given in the appendix.

6. Fuels for heating the glass are a large proportion of the raw materials - about ½ ton of coal or its equivalent per ton of glass is needed and transport cost of this and other raw materials should be considered when siting the factory as well as the transport costs of the final product to the customer.

7. It is important to use high grade refractory materials in the construction of the furnace.

8. Sheet or Window glass is used in very large quantities throughout the world mainly in housing and there is probably excess capacity in the world at the present time.

9. Sheet glass has some visible distortion and is not suitable for shop or other large windows or high class mirrors, but is cheaper than plate or float glass and is thus used almost entirely in domestic building.

10. There are three processes for making Sheet Glass, P.P.G., L.O.F. Fourcault and all three are described briefly.

11. PLATE GLASS:

freedom
This glass is used for high quality purposes where/from visible distortion is required. Large glazing plate, high quality mirrors and motor car windscreens are typical examples.

12. In the Plate process glass is rolled from a tank furnace in a continuous ribbon which is passed to a lehr through which it is passed on metal rollers and in which it is annealed.

13. On emerging from the lehr it must be ground and polished either by the Twin grinding process or the continuous table grinder.

14. The technical process of grinding involves not only the production of a uniform flat surface but also the gradual reduction of the depth of pit introduced during the production of the flat surface. This involves the use of at least twelve grinding heads and a consequently large and expensive machine.

15. With a large and expensive machine it is essential to produce high outputs so that the final cost of the glass will be able to compete with the imported product. A demand of 20 million square feet is suggested as the minimum requirement before a plant is justified.

16. FLOAT GLASS:

This is a new process. Float Glass is interchangeable with Plate. It is at present made only by one company and a licence to manufacture has recently been granted to one company in the United States.

17. A short description and diagramatic sketch of the process is given, describing the formation of a flat sheet of glass on a bath of molten metal.

18. PATTERNED GLASSES:

These glasses are made by a rolling process, and the product is translucent and used mainly in domestic buildings. It is a relatively cheap product.

19. HOLLOW GLASS BLOCKS:

Made by pressing hot "gobs" of glass in moulds on automatic machines, half blocks are later sealed by pressing together two half blocks after the edges have been melted. The blocks which are translucent and have a high thermal insulation value are used in domestic and commercial buildings.

20. OPAQUE CLADDING GLASSES:

These glasses are used more and more as a surface finish on the outside of buildings. Many colours can be produced and heat treatment of the glass is frequently undertaken to enable the glass to withstand the thermal shock caused by uneven heating of the glass by the sun.

21. YEARLY DEMANDS JUSTIFYING ECONOMIC PRODUCTION

SHEET (double strength basis)	20,000,000 sq.ft. per annum
PLATE	20,000,000 " " " "
FLOAT	Not yet available
ROLLED	15,000,000 " " " "
GLASS BLOCKS (when made in conjunction with other pressed articles)	100,000 units " "
CLADDING GLASSES	2,000,000 sq.ft. per annum

22. If these demands exist raw material supplies should be examined and cost exercises carried out.

23. Starting up a plant may result in quite prolonged periods of breakage and poor quality. If technical help is engaged it must be that of experts with real practical experience of running the type of glass plant that is being installed.

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